Sensor to Serial (RS-232/485)

Model: S-[Sensor]-[Temperature]-[I/O]

1. Features:

- Rich sensor options: Temperature, Humidity, PM2.5, CO, CO2, CH2O, VOC, pressure, RFID
- Interface: RS-232 or RS-485 or RS-485 Modbus RTU
- Support external I/O control interface, ex. PIR or Relay
- Support Real Time Location System (RTLS) applications
- Configurable auto report period and power level

2. Applications:

- Environment monitoring
- Support WSN or IOT
- Superstore, Lab, Warehouse
- SCADA
- Factory automation

3. Model No. naming: S-[Sensor]-[Temperature]-[I/O]

[Sensor]	[Temperature]	[I/O]
RFID:Mifare PM25: PM2.5 CO:Carbon monoxide CO2:Carbon dioxide CH2O: Formaldehyde VOC:Volatile organic compounds (Empty): N/A	TH:Temperature/Humidity THP: Temperature/Humidity/Pressure NTC: NTC Temperature sensor (Empty): N/A	PIR:PIR sensor *DIO:Digital I/O (Empty): N/A

EX: S-PM25-TH-DIO, S-THP, S-CO2-PIR

Remark:

Each sensor will be optioned by the specification if the requirement is over the range of the default sensor model. Please check the next section for reference.

*DIO: Digital In/Out to be customized, please offer the requirements

4. Sensor specifications

4.1 PM2.5-1: (Wnsen ZH03A)

- Working Current 70-140(mA)
- Dormancy current 70mA
- Response Time ≤90s
- Working Humidity 15%RH-80%RH(no condensation)
- Working Temperature -20~40℃
- PM2.5 concentration output range 0-1000ug/m3
- Period 1000ms±5%
- High level output at the period start 200us(theoretical value)
- Low level output at the period end 200us (theoretical value)

4.2 CO: (Winsn ZE-07-CO)

- Measurement Range: 0~500 ppm
- Resolution ratio: 0.1 ppm
- Response time(T90) ≤ 60 S
- Repeatability: <3% output value
- Stability (/year): <10%
- Zero drift(-20℃~40℃): ≤10 ppm

4.3 CO2: (Winsen MH-Z19B)

- Average current: < 60mA(@5V)
- Peak current:150mA (@5V)
- Preheat time: 3 min
- Response Time: T90< 120 s
- Working temperature: 0 ~ 50 ℃
- Working humidity: 0~ 90% RH (No condensation)
- Measuring Range: 0～2000 ppm
- Accuracy: ± (50ppm+3% reading value)

4.4 CH2O: (Winsen ZE08-CH2O)

- Measurement Range: 0-5 ppm
- Sensitivity: (0.45±0.15) μA/ppm
- Resolution ratio: ≤0.01ppm
- Response time (T90): ≤60S
- Repeatability: ＜2% output value
- Zero drift (-20℃～40℃): ≤0.2ppm
- Humidity Range: 15% ~90% RH
- Temperature Range: -20℃～50℃

- Pressure range: normal atmosphere ± 10%

4.5 VOC: (Winsen ZP01)

- Target Gas: formaldehyde, benzene, carbon monoxide, hydrogen, alcohol, ammonia, smoke of cigarette, essence &etc.
- Output Data: 0~3 grade pollution signal
- Working Current: ≤60mA
- Warm Up Time: ≤3 min
- Response Time: ≤20s
- Recovery Time: ≤60s
- Operating Temperature: 0～50℃
- Operating Humidity: ≤95％RH
- Storage Temperature: -20~60℃
- Sensitivity Attenuator: ≤1%/year

4.6 TH: (SENSIRON SHT-20)

- Humidity Accuracy: ±3 %RH
- Temperature Accuracy: ±0.3℃
- Energy consumption: 3.2μW (at 8 bit, 1 measurement / s)
- RH operating range: 0 - 100% RH
- Operating range: -40 to +125℃ (-40 to +257℉)
- RH response time: 8 sec (tau63%)

4.7 THP: (BOSH BME280)

- Operation range: -40~+85 ℃, 0~100 % rel. humidity, 300~1100 hPa
- Temperature sensor
  Accuracy @ 25 ℃: ±0.5˚C
  Accuracy @ 0~65 ℃(full): ±1˚C
- Humidity sensor:
  Response time 1 s
  Accuracy tolerance ±3 % relative humidity
  Hysteresis ±1% relative humidity
- Pressure sensor:
  RMS Noise: 0.2 Pa, equiv. to 1.7 cm
  Offset temperature coefficient: ±1.5 Pa/K, equiv. to ±12.6 cm at 1 ˚C temperature change

4.8 NTC:

- Resistance at 25 degrees C: 10K ± 1%
- B25/50 = 3950±1%

- Thermal time constant <= 15 seconds
- Thermistor temperature range -40 ℃ to 200 ℃
- Wire: 100cm, 28 AWG PVC
- Head: Stainless, 6*30mm

4.9 RFID:
- Supports ISO/IEC 14443 A/MIFARE and NTAG
- Supports MF1xxS20, MF1xxS70 and MF1xxS50 encryption in Read/Write mode
- Sleep current: <80uA
- Peak current: <30mA
- Frequency: 13.56MHz
- Tag: mifare1 S50、mifare1 S70、mifare UltraLight、mifare Pro、mifare Desfire
- Working Temperature: -20~80 Degree C
- Storage: -40~85 Degree C
- Humidity: 5%~95%

5. Interface Specifications:
- RS-232: 9600 bps, 8-N-1
- RS-485: 9600 bps, 8-N-1
- RS-485 Modbus RTU: 9600 bps, 8-N-1

6. Configuration:

6.1 Set Command set: via RS-232, RS-485

“*RST”: Reboot the device

“READ?”: read the sensor value

6.2 RS-485 Modbus RTU: 9600,8-N-1

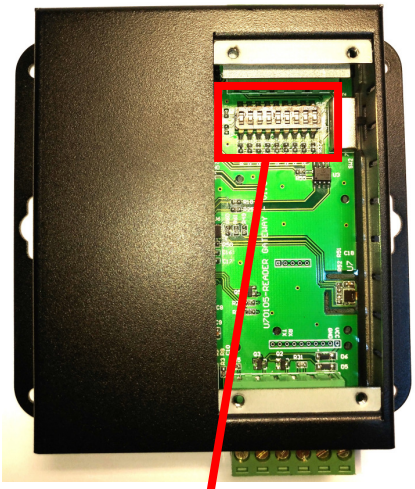
Read:

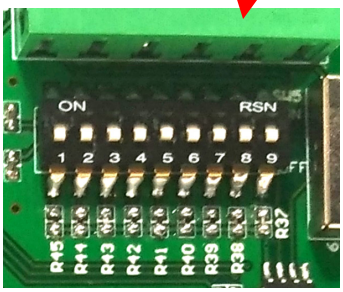
ID	Fucntion	Data	CRC16
1 Byte,0x01~0x7F	0x03	0x00	2 Byte

Response:

ID	Fucntion	Data Length	Data	CRC16
1 Byte,0x01~0x7F	0x03	0x04	4 Byte	2 Byte

6.3 DIP switch: remove the 4 screws to open the upper cover.





ON: 1

OFF:0 (Default)

1	2	3	4	5	6	7	8	9
Config	Format	Report	Base-1	Base-2	Time-1	Time-2	Time-3	Time-4
0: HW 1: SW	0: Raw 1: Tag	0: Auto	00: Second 01: Minute 10: Hour 11: Day *Remark		0000:1 0100:5 1000:9 1100:13 0001:2 0101:6 1001:10 1101:14 0010:3 0110:7 1010:11 1110:15 0011:4 0111:8 1011:12 1111:16 *Remark			
		1: Poll	Poll the sensor value by the command set via RS-232 or RS-485, please check the command table. If you set the Modbus RTU command, the pin setting will indicate the Modbus ID: 1~64 The following string indicates the DIP No.: [4] [5] [6] [7] [8] [9] 000000:1 010000:17 100000:33 110000:49 000001:2 010001:18 100001:34 110001:50 000010:3 010010:19 100010:35 110010:51 000011:4 010011:20 100011:36 110011:52 000100:5 010100:21 100100:37 110100:53 000101:6 010101:22 100101:38 110101:54 000110:7 010110:23 100110:39 110110:55					

			000111:8 010111:24 100111:40 110111:56 001000:9 011000:25 101000:41 111000:57 001001:10 011001:26 101001:42 111001:58 001010:11 011010:27 101010:43 111010:59 001011:12 011011:28 101011:44 111011:60 001100:13 011100:29 101100:45 111100:61 001101:14 011101:30 101101:46 111101:62 001110:15 011110:31 101110:47 111110:63 001111:16 011111:32 101111:48 111111:64

*Remark: The other time not listed in the table will be configured by command. Please turn off the device and switch the DIP No. 1 to SW.

7. Sensor Data format:

7.1 Raw:

Sensor Value							
	0x00	0x00	0x00	0x00			
Byte0	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7

Sensor value:

ASCII Value	Byte0	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7	
Sesnor Name	D0	D1	D2(+/-)	D3	D4	D5	D6	D7	D8~D10
None	0X30	0X30							(Reserved)
Temperature(SHT-20)	0x30	0x31	+:0x2b,-0x2d	0~F	0~F	.0x2e	0~F	0~F	
Humidity(SHT-20)	0x30	0x32	+	0~F	0~F				
CO2	0x30	0x34	+	0~F	0~F	0~F	0~F		
CO	0x30	0x35	+	0~F	0~F	0~F	0~F		
PM2.5	0x30	0x37	+	0~F	0~F	0~F	0~F		
Temperature(BME280	0x30	0x38	+:0x2b,-0x2d	0~F	0~F	.0x2e	0~F	0~F	
Humidity(BME280)	0x30	0x39	+	0~F	0~F				
Pressure(BME280)	0x30	0x41(A)	+	0~F	0~F	0~F	0~F		
Temperature(NTC)	0x30	0x42(B)	+:0x2b,-0x2d	0~F	0~F	.0x2e	0~F	0~F	
PM1.0	0x30	0x43(C)	+	0~F	0~F	0~F	0~F		
PM10	0x30	0x44(D)	+	0~F	0~F	0~F	0~F		
CH2O	0x30	0x45(E)	+	0~F	0~F	0~F	0~F		
VOC	0x30	0x46(F)	+	0~F	0~F	0~F	0~F		

7.2 Tag:

Lenth	Flag	BR/EDR(N/A)	Lenth	Manufacture Specific Da	Manufacture code		Becon Code		Tag Type
0x02	0x01	0x04	0x1b	0xff(Self define)	0x59	0x00	0xAA	0xBC	0x01~0x03
Byte0	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7	Byte8	Byte9

MAC ID						Tag Battery	Button Status
						Hex(Divid by 10	Push(0x01)/None(0x00
Byte10	Byte11	Byte12	Byte13	Byte14	Byte15	Byte16	Byte17

Motion Status	Sensor Value							
Move(0x01)/Stay(0x00)		0x00	0x00	0x00	0x00			
Byte18	Byte19	Byte20	Byte21	Byte22	Byte23	Byte24	Byte25	Byte26

Reserved			
0x00	0x00	0x00	0x00
Byte27	Byte28	Byte29	Byte30

Sensor value:

ASCII Value	Byte 19	Byte 20	Byte 21	Byte 22	Byte 23	Byte 24	Byte 25	Byte 26	
Sesnor Name	D0	D1	D2(+/-)	D3	D4	D5	D6	D7	D8~D10
None	0X30	0X30							(Reserved)
Temperature(SHT-20)	0x30	0x31	+:0x2b,-0x2d	0~F	0~F	.0x2e	0~F	0~F	
Humidity(SHT-20)	0x30	0x32	+	0~F	0~F				
CO2	0x30	0x34	+	0~F	0~F	0~F	0~F		
CO	0x30	0x35	+	0~F	0~F	0~F	0~F		
PM2.5	0x30	0x37	+	0~F	0~F	0~F	0~F		
Temperature(BME280)	0x30	0x38	+:0x2b,-0x2d	0~F	0~F	.0x2e	0~F	0~F	
Humidity(BME280)	0x30	0x39	+	0~F	0~F				
Pressure(BME280)	0x30	0x41(A)	+	0~F	0~F	0~F	0~F		
Temperature(NTC)	0x30	0x42(B)	+:0x2b,-0x2d	0~F	0~F	.0x2e	0~F	0~F	
PM1.0	0x30	0x43(C)	+	0~F	0~F	0~F	0~F		
PM10	0x30	0x44(D)	+	0~F	0~F	0~F	0~F		
CH2O	0x30	0x45(E)	+	0~F	0~F	0~F	0~F		
VOC	0x30	0x46(F)	+	0~F	0~F	0~F	0~F		

Remark: All contents are subject to change without notice.

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